

SAF-RC-232
100-IU-2 & 100-IU-6 Remaining
Waste Sites – Soil Full Protocol
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt

H4-21

KW 8/12/13
INITIAL/DATE

COMMENTS:

SDG XP0002

SAF-RC-232

Rad only

☒ Chem only

Rad & Chem

☒ Complete

Partial

Sample Location: 600-372:1



August 07, 2013

Joan Kessner
WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354

Re: RC-232 Soil
Work Order: 330221
SDG: XP0002

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 25, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 1616.

Sincerely,

Orlette Johnson
Project Manager

Purchase Order: 1510
Chain of Custody: RC-232-041
Enclosures



Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	3
Laboratory Certifications.....	6
HPLC Polynuclear Aromatic Hydrocarbon Analysis.....	8
Sample Data Summary.....	15
QC Summary.....	18
Miscellaneous Data.....	23
FID Diesel Range Organics Analysis.....	26
Case Narrative.....	27
Sample Data Summary.....	32
Quality Control Summary.....	35
Miscellaneous.....	38
PCB Analysis.....	40
Case Narrative.....	41
Sample Data Summary.....	45
Quality Control Summary.....	48
Miscellaneous.....	51
Metals Analysis.....	53
Case Narrative.....	54
Sample Data Summary.....	61

Quality Control Summary.....69

Case Narrative

**Receipt Narrative
for
WC-HANFORD, INC.
SDG: XP0002
Work Order: 330221**

August 07, 2013

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on July 25, 2013 for analysis.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
330221001	J1RVK2
330221002	J1RVK3
330221003	J1RVK4

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Diesel Range Organics, GC Semivolatile PCB, HPLC Polynuclear Aromatic Hydrocarbon and Metals.



Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

SAMPLE RECEIPT & REVIEW FORM

Client: <u>WCHN</u>		SDG/AR/COC/Work Order: <u>330221</u>	
Received By: <u>JP</u>		Date Received: <u>7-25-13</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0 cpm</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>ice bags</u> Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>41502209</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?			<input checked="" type="checkbox"/>	Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?			<input checked="" type="checkbox"/>	Sample ID's and containers affected:
7 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Carrier and tracking number.				Circle Applicable: <u>FedEx Air</u> FedEx Ground UPS Field Services Courier Other <u>7963 0580 2629</u>

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 07 August 2013

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP A2LA ISO 17025	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Nevada	SC000122011-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-13-8
Utah NELAP	SC000122013-8
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

HPLC Polynuclear Aromatic Hydrocarbon Analysis

**HPLC-PAH
WC-HANFORD, INC. (WCHN)
SDG XP0002**

Method/Analysis Information

Procedure: Polynuclear Aromatic Hydrocarbons
Analytical Method: SW846 8310
Prep Method: SW846 3550B
Analytical Batch Number: 1318151
Prep Batch Number: 1318150

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8310:

Sample ID	Client ID
330221002	J1RVK3
330221003	J1RVK4
1202916848	Method Blank (MB)
1202916849	Laboratory Control Sample (LCS)
1202917766	330221003(J1RVK4) Matrix Spike (MS)
1202917769	330221003(J1RVK4) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP).

The data discussed in this narrative has been analyzed in accordance with GL-OA-E-030 REV# 15.

Raw data reports are processed and reviewed by the analyst using the Target software package. False positives have been removed from the Target quantitation reports per standard operating procedures (SOP) section 18.0.

Calibration Information

Due to software limitations, the files displayed at the beginning of the Form 6 are only the last files uploaded for each individual level. A complete listing of all files used in the current ICAL are shown on the Calibration History that is included with each Level 4 or higher package. The last file by date in each level is the one currently uploaded for that level.

The linear equation used in Target and indicated on the initial calibration summary form is not a conventional linear equation (slope intercept formula) and does not match the equation found in SW-846 method 8000B. The x and y axes are inversed in Target, so that the instrument response is treated as the independent variable (x) and the concentration ratio is treated as the dependent variable (y). The equation used in Target to calculate sample results is adjusted to account for the linear equation inversion and reciprocal slope. The adjusted calculation has been independently verified to produce valid results.

Initial Calibration

All initial calibration requirements have been met for this SDG.

CCV Requirements

All associated calibration verification standards (ICV or CCV) met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All the surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Laboratory Control Sample Duplicate (LCSD) Recovery

An LCSD was not extracted.

LCS/LCSD Relative Percent Difference (RPD) Statement

An LCSD was not extracted.

QC Sample Designation

Sample 330221003 (J1RVK4) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPDs between the MS and MSD met the acceptance limits.

Technical Information:

Holding Time Specifications

All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents.

A data exception report (DER) was not generated for this SDG.

Manual Integrations

Some initial calibration standards, continuing calibration standards, and/or samples required manual integrations due to software limitations.

Please see the raw data in the Miscellaneous Section.

Additional Comments

One or more analytes were detected on both columns or detectors that indicated an acceptable peak within the retention time window and acceptable concentration match in samples 330221002 (J1RVK3) and 330221003 (J1RVK4). Although method criteria have been satisfied for reporting a positive result for these analytes, the result is considered a false positive due to matrix interference and/or comparison to the DAD generated spectrum and is indicated as such on the appropriate Form I/Certificate of Analysis (C of A) with an 'X' qualifier.

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data and package. The data validator will always sign and date the case narrative.

Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

System Configuration

The laboratory utilizes a high performance liquid chromatography (HPLC) instrument configuration for Polynuclear Aromatic Hydrocarbons analyses.

The chromatographic hardware system consists of a HP Model 1100 HPLC with programmable gradient pumping and a 100 uL loop injector.

The HPLC 1100 is coupled to a HP Model G1315A Diode Array UV detector which monitors absorbance at the following five wavelengths: 1) 224 nm; 2) 250 nm; 3) 270 nm; 4) 234 nm; 5) 300 nm.

The HPLC 1100 is also coupled to a HP Model G1321A Fluorescence Detector in series which monitors the following varying excitations and emissions 1) EX 230 nm EM 330 nm; 2) EX 210 nm EM 314 nm; 3) EX 250 nm EM 368 nm; 4) EX 237 nm EM 440 nm; 5) EX 277 nm EM 376 nm; 6) EX 255 nm EM 420 nm; 7) EX 230 nm EM 453 nm.

The Diode Array UV detector is used as the primary detector and the Fluorescence Detector is used as the confirmation detector. All results are reported from the primary Diode Array UV detector.

The HPLC system is identified with a designation of HPLC E in the raw data printouts.

Chromatographic Columns

Chromatographic separation of Polynuclear Aromatic Hydrocarbons is accomplished through analysis on the following reversed phase columns:

Phenomenex: Luna C18 (2), 100 A, 250 mm x 4.6 mm containing 5 um size particle.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0002 GEL Work Order: 330221 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Michael Penny

Date: 03 AUG 2013

Title: Group Leader

Roadmap for WCHN XP0002 HPLC_PAH

This roadmap was analyzed by cww on 08-02-2013, 09:55.

This roadmap was reviewed by map on 08-02-2013, 11:48.

This roadmap was packaged by map on 08-03-2013, 09:31.

Sample

exclude	manual	datafile	smpid	injdate	injtime	sublist	clientid	dilution	batchid	comment
■	N	/chem/hplce.i/p072913.b/ph5g2906.d	330221002	29-JUL-2013	14:14	XP0002.sub	J1RVK3	1	1317520	Duse
□	N	/chem/hplce.i/p073113.b/ph5g3106.d	330221002	31-JUL-2013	10:55	XP0002.sub	J1RVK3	1	1318151	
■	N	/chem/hplce.i/p072913.b/ph5g2910.d	330221003	29-JUL-2013	17:03	XP0002.sub	J1RVK4	1	1317520	Duse
□	N	/chem/hplce.i/p073113.b/ph5g3107.d	330221003	31-JUL-2013	11:37	XP0002.sub	J1RVK4	1	1318151	

QC Sample

exclude	manual	datafile	smpid	sampletype	injdate	injtime	sublist	clientid	dilution	batchid	comment
■	N	/chem/hplce.i/p072913.b/ph5g2904.d	1202915415	mb	29-JUL-2013	12:50	XP0002.sub	PAHBLK01	1	1317520	Duse
■	N	/chem/hplce.i/p072913.b/ph5g2905.d	1202915416	lcs	29-JUL-2013	13:32	XP0002.sub	PAHBLK01LCS	1	1317520	Duse, ONE ANALYTE LOW
■	N	/chem/hplce.i/p072913.b/ph5g2907.d	1202915416	lcs	29-JUL-2013	14:56	XP0002.sub	PAHBLK01LCS	1	1317520	DUSE
■	N	/chem/hplce.i/p072913.b/ph5g2908.d	1202915419	ms	29-JUL-2013	15:38	XP0002.sub	J1RVK3MS	1	1317520	Duse
■	N	/chem/hplce.i/p072913.b/ph5g2909.d	1202915420	msd	29-JUL-2013	16:20	XP0002.sub	J1RVK3MSD	1	1317520	Duse
□	N	/chem/hplce.i/p073113.b/ph5g3104.d	1202916848	mb	31-JUL-2013	09:30	XP0002.sub	PAHBLK01	1	1318151	
□	N	/chem/hplce.i/p073113.b/ph5g3105.d	1202916849	lcs	31-JUL-2013	10:12	XP0002.sub	PAHBLK01LCS	1	1318151	Pass
□	N	/chem/hplce.i/p073113.b/ph5g3108.d	1202917766	ms	31-JUL-2013	12:19	XP0002.sub	J1RVK4MS	1	1318151	Pass
□	N	/chem/hplce.i/p073113.b/ph5g3109.d	1202917769	msd	31-JUL-2013	13:01	XP0002.sub	J1RVK4MSD	1	1318151	Pass

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: August 2, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK3
Sample ID: 330221002
Matrix: SOIL
Collect Date: 23-JUL-13 10:15
Receive Date: 25-JUL-13
Collector: Client
Moisture: 1.55%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.07	5.07	16.9	ug/kg	1	LER	07/31/13	1055	1318151	1
Acenaphthylene	U	5.07	5.07	16.9	ug/kg	1					
Anthracene	U	1.69	1.69	16.9	ug/kg	1					
Benzo(a)anthracene	U	0.541	0.541	1.69	ug/kg	1					
Benzo(a)pyrene	J	0.979	0.541	1.69	ug/kg	1					
Benzo(b)fluoranthene	J	0.753	0.541	1.69	ug/kg	1					
Benzo(ghi)perylene	JX	0.600	0.541	1.69	ug/kg	1					
Benzo(k)fluoranthene	U	0.270	0.270	0.845	ug/kg	1					
Chrysene	U	0.541	0.541	1.69	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.541	0.541	1.69	ug/kg	1					
Fluoranthene	J	0.972	0.541	1.69	ug/kg	1					
Fluorene	U	5.07	5.07	16.9	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.541	0.541	1.69	ug/kg	1					
Naphthalene	U	5.07	5.07	16.9	ug/kg	1					
Phenanthrene	U	5.07	5.07	16.9	ug/kg	1					
Pyrene	J	1.01	0.541	1.69	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	07/29/13	1820	1318150
SW846 3550B	3550B PAH BY HPLC Prep in soil	MXS4	07/25/13	1750	1317518

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 8310		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	6910 ug/kg	8450	81.8	(23%-104%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: August 2, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK4
Sample ID: 330221003
Matrix: SOIL
Collect Date: 23-JUL-13 10:15
Receive Date: 25-JUL-13
Collector: Client
Moisture: 1.38%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.06	5.06	16.9	ug/kg	1	LER	07/31/13	1137	1318151	1
Acenaphthylene	U	5.06	5.06	16.9	ug/kg	1					
Anthracene	U	1.69	1.69	16.9	ug/kg	1					
Benzo(a)anthracene		1.94	0.540	1.69	ug/kg	1					
Benzo(a)pyrene		2.05	0.540	1.69	ug/kg	1					
Benzo(b)fluoranthene	J	1.40	0.540	1.69	ug/kg	1					
Benzo(ghi)perylene	JX	1.07	0.540	1.69	ug/kg	1					
Benzo(k)fluoranthene	U	0.270	0.270	0.844	ug/kg	1					
Chrysene		1.80	0.540	1.69	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.540	0.540	1.69	ug/kg	1					
Fluoranthene		2.40	0.540	1.69	ug/kg	1					
Fluorene	U	5.06	5.06	16.9	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.540	0.540	1.69	ug/kg	1					
Naphthalene	U	5.06	5.06	16.9	ug/kg	1					
Phenanthrene	U	5.06	5.06	16.9	ug/kg	1					
Pyrene		3.29	0.540	1.69	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	07/29/13	1820	1318150
SW846 3550B	3550B PAH BY HPLC Prep in soil	MXS4	07/25/13	1750	1317518

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 8310		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	7110 ug/kg	8440	84.2	(23%-104%)

Notes:

QC Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: August 2, 2013

Page 1 of 4

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1318151										
QC1202916849	LCS										
Acenaphthene	1670			1350	ug/kg		81.1	(58%-99%)	LER	07/31/13	10:12
Acenaphthylene	1670			1350	ug/kg		81	(58%-98%)			
Anthracene	1670			1410	ug/kg		84.4	(63%-94%)			
Benzo(a)anthracene	167			137	ug/kg		82.1	(73%-98%)			
Benzo(a)pyrene	167			134	ug/kg		80.2	(63%-99%)			
Benzo(b)fluoranthene	167			136	ug/kg		81.8	(70%-130%)			
Benzo(ghi)perylene	167			133	ug/kg		80.1	(70%-130%)			
Benzo(k)fluoranthene	83.3			62.5	ug/kg		75	(70%-130%)			
Chrysene	167			155	ug/kg		93.1	(70%-130%)			
Dibenzo(a,h)anthracene	167			160	ug/kg		95.8	(70%-130%)			
Fluoranthene	167			132	ug/kg		79.4	(70%-130%)			
Fluorene	1670			1370	ug/kg		82.2	(65%-130%)			
Indeno(1,2,3-cd)pyrene	167			145	ug/kg		86.9	(70%-130%)			
Naphthalene	1670			1300	ug/kg		78.3	(57%-130%)			
Phenanthrene	1670			1360	ug/kg		81.7	(70%-130%)			
Pyrene	167			143	ug/kg		85.8	(70%-130%)			
**Decafluorobiphenyl	8330			6870	ug/kg		82.5	(23%-104%)			
QC1202916848	MB										
Acenaphthene			U	5.00	ug/kg					07/31/13	09:30
Acenaphthylene			U	5.00	ug/kg						

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1318151										
Anthracene			U	1.67	ug/kg						
Benzo(a)anthracene			U	0.533	ug/kg				LER	07/31/13	09:30
Benzo(a)pyrene			U	0.533	ug/kg						
Benzo(b)fluoranthene			U	0.533	ug/kg						
Benzo(ghi)perylene			U	0.533	ug/kg						
Benzo(k)fluoranthene			U	0.267	ug/kg						
Chrysene			U	0.533	ug/kg						
Dibenzo(a,h)anthracene			U	0.533	ug/kg						
Fluoranthene			U	0.533	ug/kg						
Fluorene			U	5.00	ug/kg						
Indeno(1,2,3-cd)pyrene			U	0.533	ug/kg						
Naphthalene			U	5.00	ug/kg						
Phenanthrene			U	5.00	ug/kg						
Pyrene			U	0.533	ug/kg						
**Decafluorobiphenyl	8330			6980	ug/kg		83.8	(23%-104%)			
QC1202917766 330221003 MS											
Acenaphthene	1690	U	5.06	1400	ug/kg		82.7	(49%-90%)		07/31/13	12:19
Acenaphthylene	1690	U	5.06	1400	ug/kg		82.8	(48%-97%)			
Anthracene	1690	U	1.69	1450	ug/kg		86.1	(49%-91%)			
Benzo(a)anthracene	169		1.94	142	ug/kg		82.9	(29%-126%)			
Benzo(a)pyrene	169		2.05	142	ug/kg		82.9	(26%-130%)			
Benzo(b)fluoranthene	169	J	1.40	142	ug/kg		83	(32%-135%)			
Benzo(ghi)perylene	169	JX	1.07	139	ug/kg		81.9	(34%-125%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1318151										
Benzo(k)fluoranthene	84.5	U	0.270	65.0	ug/kg		76.9	(48%-142%)	LER	07/31/13	12:19
Chrysene	169		1.80	161	ug/kg		94.3	(39%-127%)			
Dibenzo(a,h)anthracene	169	U	0.540	166	ug/kg		98.2	(38%-130%)			
Fluoranthene	169		2.40	138	ug/kg		80	(20%-139%)			
Fluorene	1690	U	5.06	1420	ug/kg		83.8	(51%-90%)			
Indeno(1,2,3-cd)pyrene	169	U	0.540	151	ug/kg		89.2	(41%-145%)			
Naphthalene	1690	U	5.06	1340	ug/kg		79.1	(43%-87%)			
Phenanthrene	1690	U	5.06	1410	ug/kg		83.3	(50%-100%)			
Pyrene	169		3.29	149	ug/kg		86.3	(18%-149%)			
**Decafluorobiphenyl	8450		7110	7060	ug/kg		83.6	(23%-104%)			
QC1202917769 330221003 MSD											
Acenaphthene	1690	U	5.06	1370	ug/kg	2.02	81.1	(0%-30%)		07/31/13	13:01
Acenaphthylene	1690	U	5.06	1370	ug/kg	2.15	81.1	(0%-30%)			
Anthracene	1690	U	1.69	1430	ug/kg	1.68	84.7	(0%-30%)			
Benzo(a)anthracene	169		1.94	139	ug/kg	2.23	81.1	(0%-30%)			
Benzo(a)pyrene	169		2.05	140	ug/kg	1.22	81.9	(0%-30%)			
Benzo(b)fluoranthene	169	J	1.40	138	ug/kg	2.46	81	(0%-30%)			
Benzo(ghi)perylene	169	JX	1.07	136	ug/kg	2.49	79.9	(0%-30%)			
Benzo(k)fluoranthene	84.4	U	0.270	63.6	ug/kg	2.09	75.4	(0%-30%)			
Chrysene	169		1.80	157	ug/kg	2.82	91.7	(0%-30%)			
Dibenzo(a,h)anthracene	169	U	0.540	162	ug/kg	2.46	95.9	(0%-30%)			
Fluoranthene	169		2.40	135	ug/kg	2.19	78.3	(0%-30%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1318151										
Fluorene	1690	U	5.06	1390	ug/kg	2.10	82.2	(0%-30%)	LER	07/31/13	13:01
Indeno(1,2,3-cd)pyrene	169	U	0.540	147	ug/kg	2.48	87.1	(0%-30%)			
Naphthalene	1690	U	5.06	1310	ug/kg	2.16	77.5	(0%-30%)			
Phenanthrene	1690	U	5.06	1380	ug/kg	1.98	81.7	(0%-30%)			
Pyrene	169		3.29	146	ug/kg	2.16	84.4	(0%-30%)			
**Decafluorobiphenyl	8440		7110	6860	ug/kg		81.2	(23%-104%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Miscellaneous Data

Prep Logbook

Extraction of Semivolatile and Nonvolatile Organic Compounds from Soil, Sludge, and Other Miscellaneous Solid Samples

Batch ID: 1318150
 Analyst: Alberto Velasco
 Method: SW846 3550B

Verified by: _____

Lab SOP: GL-OA-E-010 REV# 21
 Instrument: Semi-Volatiles Manual

Sample ID	Run Date	Aliquot (g)	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1202916848 MB	29-JUL-2013 18:20:00	30	1	0.03333
1202916849 LCS	29-JUL-2013 18:20:00	30.02	1	0.03331
330221002 - 2	29-JUL-2013 18:20:00	30.06	1	0.03327
330221003 - 2	29-JUL-2013 18:20:00	30.05	1	0.03328
1202917766 - 2 MS (330221003)	29-JUL-2013 18:20:00	30.01	1	0.03332
1202917769 - 2 MSD (330221003)	29-JUL-2013 18:20:00	30.03	1	0.0333
330227002 - 2	29-JUL-2013 18:20:00	30.07	1	0.03326
330227003 - 2	29-JUL-2013 18:20:00	30.09	1	0.03323
1202917768 - 2 MS (330227003)	29-JUL-2013 18:20:00	30.11	1	0.03321
1202917771 - 2 MSD (330227003)	29-JUL-2013 18:20:00	30.1	1	0.03322
330229006 - 2	29-JUL-2013 18:20:00	30.07	1	0.03326
1202917772 - 2 MS (330229006)	29-JUL-2013 18:20:00	30.03	1	0.0333
1202917773 - 2 MSD (330229006)	29-JUL-2013 18:20:00	30.01	1	0.03332
330324002	29-JUL-2013 18:20:00	30.02	1	0.03331
1202916850 MS (330324002)	29-JUL-2013 18:20:00	30.11	1	0.03321
1202916851 MSD (330324002)	29-JUL-2013 18:20:00	30.1	1	0.03322
330324003	29-JUL-2013 18:20:00	30.13	1	0.03319
330324004	29-JUL-2013 18:20:00	30.16	1	0.03316
330324005	29-JUL-2013 18:20:00	30.15	1	0.03317
330324006	29-JUL-2013 18:20:00	30.12	1	0.0332
330324007	29-JUL-2013 18:20:00	30.18	1	0.03313
330324008	29-JUL-2013 18:20:00	30.16	1	0.03316
330324009	29-JUL-2013 18:20:00	30.15	1	0.03317
330324010	29-JUL-2013 18:20:00	30.17	1	0.03315
330324011	29-JUL-2013 18:20:00	30.18	1	0.03313
330324012	29-JUL-2013 18:20:00	30.09	1	0.03323
330324013	29-JUL-2013 18:20:00	30.13	1	0.03319
330324014	29-JUL-2013 18:20:00	30.1	1	0.03322
330324015	29-JUL-2013 18:20:00	30.11	1	0.03321

Prep Logbook

Batch ID: 1318150
 Analyst: Alberto Velasco
 Method: SW846 3550B

Verified by: _____

Lab SOP: GL-OA-E-010 REV# 21
 Instrument: Semi-Volatiles Manual

Sample ID		Run Date	Aliquot (g)	Prepped Aliquot (mL)	Prepped Factor (mL/g)		
Type	Sample Id	Description	Serial Number		Spike Amt	Units	Comments:
LCS	1202916849	8310 PAH SPIKE	UE130325-15		1	mL	Verified By: MJS
MS	1202916850	8310 PAH SPIKE	UE130325-15		1	mL	Final Solvent: Acetonitrile
MS	1202917766	8310 PAH SPIKE	UE130325-15		1	mL	
MS	1202917768	8310 PAH SPIKE	UE130325-15		1	mL	
MS	1202917772	8310 PAH SPIKE	UE130325-15		1	mL	
MSD	1202916851	8310 PAH SPIKE	UE130325-15		1	mL	
MSD	1202917769	8310 PAH SPIKE	UE130325-15		1	mL	
MSD	1202917771	8310 PAH SPIKE	UE130325-15		1	mL	
MSD	1202917773	8310 PAH SPIKE	UE130325-15		1	mL	
SURR	All	Decafluorobiphenyl 250 mg/L	UE120907-07		1	mL	
REGNT	All	HPLC Grade Acetonitrile	1929229		5	mL	
REGNT	All	Methylene Chloride	1935652-D		300	mL	
SOURC	All	SODIUM SULFATE	1897902		30	g	

FID Diesel Range Organics Analysis

Case Narrative

**FID Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0002**

Method/Analysis Information

Procedure:	Analysis of Diesel Range Organics by Flame Ionization Detector
Analytical Method:	NWTPH-Dx in Soil
Prep Method:	SW846 3541
Analytical Batch Number:	1317735
Prep Batch Number:	1317734

Sample Analysis

The following samples were analyzed using the analytical protocol as established in NWTPH-Dx in Soil:

Sample ID	Client ID
330221002	J1RVK3
330221003	J1RVK4
1202915877	Method Blank (MB)
1202915878	Laboratory Control Sample (LCS)
1202915881	330221002(J1RVK3) Matrix Spike (MS)
1202915882	330221002(J1RVK3) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-003 REV# 23.

Raw data reports are processed and reviewed by the analyst using ChemStation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP) section 23.0.

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria. Analyte peaks eluted within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 330221002 (J1RVK3) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recovery was within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recovery was within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD met the acceptance limits.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Analyte peaks eluted within the established retention time windows for this method.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information

Data Exception (DER) Documentation

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents.

Manual Integrations

Certain standards and samples may have required manual integration to correctly position the baseline as set in the

calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The additional comments were not required.

System Configuration

The Diesel Range Organics analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
FID7.I	Agilent Gas Chromatograph	Agilent 6890N GC/FID	DB-5MS	30m x 0.25mm, 0.25um(J&W)

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0002 GEL Work Order: 330221 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Cameron Bearden

Date: 07 AUG 2013

Title: Group Leader

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: August 7, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK3
Sample ID: 330221002
Matrix: SOIL
Collect Date: 23-JUL-13 10:15
Receive Date: 25-JUL-13
Collector: Client
Moisture: 1.55%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2200	2200	6760	UG/KG	1	BYT1	07/29/13	1743	1317735	1
Motor Oil (C20-C36)	J	5600	2200	6760	UG/KG	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	MXS4	07/26/13	1745	1317734

The following Analytical Methods were performed:

Method	Description	Analyst Comments				
1	NWTPH-Dx in Soil					
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits	
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	437 UG/KG	676	64.7	(50%-150%)	

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: August 7, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK4
Sample ID: 330221003
Matrix: SOIL
Collect Date: 23-JUL-13 10:15
Receive Date: 25-JUL-13
Collector: Client
Moisture: 1.38%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2190	2190	6730	UG/KG	1	BYT1	07/29/13	1933	1317735	1
Motor Oil (C20-C36)	J	6640	2190	6730	UG/KG	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	MXS4	07/26/13	1745	1317734

The following Analytical Methods were performed:

Method	Description	Analyst Comments				
1	NWTPH-Dx in Soil					
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits	
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	445 UG/KG	673	66.1	(50%-150%)	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: August 7, 2013

Page 1 of 2

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1317735										
QC1202915878	LCS										
Diesel Range Organics (C10-C20)	66600			59400	UG/KG		89.2	(70%-130%)	BYT1	07/29/13	17:07
Motor Oil (C20-C36)	66600			61500	UG/KG		92.3	(70%-130%)			
**o-Terphenyl	666			733	UG/KG		110	(50%-150%)			
QC1202915877	MB										
Diesel Range Organics (C10-C20)			U	2160	UG/KG					07/29/13	16:30
Motor Oil (C20-C36)			U	2160	UG/KG						
**o-Terphenyl	665			474	UG/KG		71.3	(50%-150%)			
QC1202915881	330221002 MS										
Diesel Range Organics (C10-C20)	67400	U	2200	58800	UG/KG		87.2	(70%-130%)		07/29/13	18:20
Motor Oil (C20-C36)	67400	J	5600	66200	UG/KG		89.9	(70%-130%)			
**o-Terphenyl	674		437	750	UG/KG		111	(50%-150%)			
QC1202915882	330221002 MSD										
Diesel Range Organics (C10-C20)	67700	U	2200	61600	UG/KG	4.67	91	(0%-20%)		07/29/13	18:56
Motor Oil (C20-C36)	67700	J	5600	64700	UG/KG	2.23	87.4	(0%-20%)			
**o-Terphenyl	677		437	744	UG/KG		110	(50%-150%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
P	Aroclor target analyte with greater than 25% difference between column analyses.										
T	Spike and/or spike duplicate sample recovery is outside control limits.										
U	Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Z	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
o	Analyte failed to recover within LCS limits (Organics only)										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Miscellaneous

Prep Logbook

Extraction of Semivolatile and Nonvolatile Organic Compounds from Soil, Sludge, and Other Miscellaneous Solid Samples

Batch ID: 1317734
 Analyst: Matthew Selepack
 Method: SW846 3541

Verified by: _____

Lab SOP: GL-OA-E-010 REV# 21
 Instrument: Semi-Volatiles Manual

Sample ID	Run Date	Aliquot (g)	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1202915877 MB	26-JUL-2013 17:45:00	30.06	1	0.03327
1202915878 LCS	26-JUL-2013 17:45:00	30.03	1	0.0333
330221002	26-JUL-2013 17:45:00	30.05	1	0.03328
1202915881 MS (330221002)	26-JUL-2013 17:45:00	30.14	1	0.03318
1202915882 MSD (330221002)	26-JUL-2013 17:45:00	30.01	1	0.03332
330221003	26-JUL-2013 17:45:00	30.15	1	0.03317
330227002	26-JUL-2013 17:45:00	30.07	1	0.03326
1202915883 MS (330227002)	26-JUL-2013 17:45:00	30.11	1	0.03321
1202915884 MSD (330227002)	26-JUL-2013 17:45:00	30.03	1	0.0333
330227003	26-JUL-2013 17:45:00	30.07	1	0.03326
330229006	26-JUL-2013 17:45:00	30.05	1	0.03328
1202915879 MS (330229006)	26-JUL-2013 17:45:00	30.07	1	0.03326
1202915880 MSD (330229006)	26-JUL-2013 17:45:00	30.03	1	0.0333

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1202915878	AZDRO SPIKE LCS STD,4000ug/ml	WFI130716-52	1	mL	Final Solvent: CH2Cl2 Verified By: AV
MS	1202915879	AZDRO SPIKE LCS STD,4000ug/ml	WFI130716-52	1	mL	
MS	1202915881	AZDRO SPIKE LCS STD,4000ug/ml	WFI130716-52	1	mL	
MS	1202915883	AZDRO SPIKE LCS STD,4000ug/ml	WFI130716-52	1	mL	
MSD	1202915880	AZDRO SPIKE LCS STD,4000ug/ml	WFI130716-52	1	mL	
MSD	1202915882	AZDRO SPIKE LCS STD,4000ug/ml	WFI130716-52	1	mL	
MSD	1202915884	AZDRO SPIKE LCS STD,4000ug/ml	WFI130716-52	1	mL	
SURR	All	20 ppm surrogate	WE130618-04	1	mL	
REGNT	All	Methylene Chloride	1935652-D	120	mL	
SOURC	All	SODIUM SULFATE	1897902	30	g	

PCB Analysis

Case Narrative

**PCB Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0002**

Method/Analysis Information

Procedure: Analysis of Polychlorinated Biphenyls by ECD

Analytical Method: SW846 3541/8082A

Prep Method: SW846 3541

Analytical Batch Number: 1317567

Prep Batch Number: 1317565

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3541/8082A:

Sample ID	Client ID
330221002	J1RVK3
330221003	J1RVK4
1202915534	Method Blank (MB)
1202915535	Laboratory Control Sample (LCS)
1202915538	330221002(J1RVK3) Matrix Spike (MS)
1202915539	330221002(J1RVK3) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-040 REV# 20.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standards (ICV or CCV) met the acceptance criteria. All analytes were within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 330221002 (J1RVK3) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries for this SDG were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries for this SDG were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD met the acceptance limits.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns. All sample extracts were cleaned using alumina. Additionally, copper was added to all sample extracts to remove sulfur.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG in this batch.

Miscellaneous Information

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A DER was not required for the samples in this SDG in this batch.

Manual Integrations

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this PCB fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The following additional comments were required:

The higher results from either column have been chosen and reported in the data package for the client samples, MB and LCS. The data reported for the MS and MSD are from the same analytical column as the parent sample.

Due to software issue, the surrogate recovery range was not indicated or possibly indicated incorrectly in Quantitation Report. Please see Surrogate Recovery Report for correct surrogate acceptance limits.

Due to rounding differences in the calculation between the forms, the data reported in Sample Summary (form 1) and Spike Recovery Report (form 3) may differ slightly from the data reported in Identification Summary (form 10).

Aroclors quantitated on the raw data report by ChemStation data system do not necessarily represent positive Aroclor identification. In order for positive identification to be made, the Aroclor must match in pattern and retention time; as well as quantitate relatively close between the primary and confirmation columns, as specified in SW846 method 8000. When these conditions are not met, the Aroclor is reported as a non-detect on the data report.

System Configuration

The Semi-Volatiles-PCB analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD8A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide I)
ECD8A.I_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP II	30m x 0.25mm, 0.20um (Rtx-CLPesticide II)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 31, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK3
Sample ID: 330221002
Matrix: SOIL
Collect Date: 23-JUL-13 10:15
Receive Date: 25-JUL-13
Collector: Client
Moisture: 1.55%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	U	1.13	1.13	3.38	ug/kg	1	JXM	07/29/13	0751	1317567	1
Aroclor-1221	U	1.13	1.13	3.38	ug/kg	1					
Aroclor-1232	U	1.13	1.13	3.38	ug/kg	1					
Aroclor-1242	U	1.13	1.13	3.38	ug/kg	1					
Aroclor-1248	U	1.13	1.13	3.38	ug/kg	1					
Aroclor-1254	U	1.13	1.13	3.38	ug/kg	1					
Aroclor-1260	U	1.13	1.13	3.38	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	AXV1	07/26/13	1655	1317565

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8082A	
2	SW846 3541/8082A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	4.43 ug/kg	6.76	65.5	(34%-121%)
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	4.80 ug/kg	6.76	71.0	(37%-121%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 31, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK4
Sample ID: 330221003
Matrix: SOIL
Collect Date: 23-JUL-13 10:15
Receive Date: 25-JUL-13
Collector: Client
Moisture: 1.38%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	U	1.13	1.13	3.38	ug/kg	1	JXM	07/29/13	0828	1317567	1
Aroclor-1221	U	1.13	1.13	3.38	ug/kg	1					
Aroclor-1232	U	1.13	1.13	3.38	ug/kg	1					
Aroclor-1242	U	1.13	1.13	3.38	ug/kg	1					
Aroclor-1248	U	1.13	1.13	3.38	ug/kg	1					
Aroclor-1254	U	1.13	1.13	3.38	ug/kg	1					
Aroclor-1260	U	1.13	1.13	3.38	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	AXV1	07/26/13	1655	1317565

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8082A	
2	SW846 3541/8082A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.48 ug/kg	6.76	81.1	(34%-121%)
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.65 ug/kg	6.76	83.5	(37%-121%)

Notes:

Quality Control Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: August 7, 2013

Page 1 of 2

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1317567										
QC1202915535	LCS										
Aroclor-1016	33.3			21.5	ug/kg		64.6	(43%-120%)	JXM	07/29/13	07:39
Aroclor-1260	33.3			21.3	ug/kg		63.9	(45%-127%)			
**4cmx	6.66			4.70	ug/kg		70.5	(37%-121%)			
**Decachlorobiphenyl	6.66			4.35	ug/kg		65.3	(34%-121%)			
QC1202915534	MB										
Aroclor-1016			U	1.11	ug/kg					07/29/13	07:26
Aroclor-1221			U	1.11	ug/kg						
Aroclor-1232			U	1.11	ug/kg						
Aroclor-1242			U	1.11	ug/kg						
Aroclor-1248			U	1.11	ug/kg						
Aroclor-1254			U	1.11	ug/kg						
Aroclor-1260			U	1.11	ug/kg						
**4cmx	6.65			4.53	ug/kg		68.1	(37%-121%)			
**Decachlorobiphenyl	6.65			4.55	ug/kg		68.4	(34%-121%)			
QC1202915538	330221002	MS									
Aroclor-1016	33.7	U	1.13	20.1	ug/kg		59.7	(21%-132%)		07/29/13	08:03
Aroclor-1260	33.7	U	1.13	20.2	ug/kg		59.9	(24%-126%)			
**4cmx	6.75		4.80	4.34	ug/kg		64.4	(37%-121%)			
**Decachlorobiphenyl	6.75		4.43	3.92	ug/kg		58.1	(34%-121%)			
QC1202915539	330221002	MSD									
Aroclor-1016	33.8	U	1.13	26.0	ug/kg	25.4	76.9	(0%-30%)		07/29/13	08:16

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 2 of 2

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1317567										
Aroclor-1260	33.8	U	1.13	25.8	ug/kg	24.5	76.5	(0%-30%)			
**4cmx	6.76		4.80	5.68	ug/kg		84.1	(37%-121%)	JXM	07/29/13	08:16
**Decachlorobiphenyl	6.76		4.43	4.96	ug/kg		73.4	(34%-121%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Miscellaneous

Prep Logbook

Automated Soxhlet Extraction

Batch ID: 1317565
Analyst: Alberto Velasco
Method: SW846 3541

Verified by: _____

Lab SOP: GL-OA-E-066 REV# 5
Instrument: Semi-Volatiles Manual

Sample ID	Run Date	Aliquot (g)	Clean Up	Amount 1 (mL)	Amount 2 (mL)	Amount 3 (mL)	Prepped Aliquot (mL)	Prepped Factor (mL/g)
1202915534 MB	26-JUL-2013 16:55:00	30.06	H2SO4/KM 2 nO4	2	9	1	0.03327	
1202915535 LCS	26-JUL-2013 16:55:00	30.02	H2SO4/KM 2 nO4	2	9	1	0.03331	
330221002	26-JUL-2013 16:55:00	30.03	H2SO4/KM 2 nO4	2	9	1	0.0333	
1202915538 MS (330221002)	26-JUL-2013 16:55:00	30.11	H2SO4/KM 2 nO4	2	9	1	0.03321	
1202915539 MSD (330221002)	26-JUL-2013 16:55:00	30.05	H2SO4/KM 2 nO4	2	9	1	0.03328	
330221003	26-JUL-2013 16:55:00	30.01	H2SO4/KM 2 nO4	2	9	1	0.03332	
330227002	26-JUL-2013 16:55:00	30.03	H2SO4/KM 2 nO4	2	9	1	0.0333	
1202915540 MS (330227002)	26-JUL-2013 16:55:00	30.16	H2SO4/KM 2 nO4	2	9	1	0.03316	
1202915541 MSD (330227002)	26-JUL-2013 16:55:00	30.11	H2SO4/KM 2 nO4	2	9	1	0.03321	
330227003	26-JUL-2013 16:55:00	30.04	H2SO4/KM 2 nO4	2	9	1	0.03329	
330229006	26-JUL-2013 16:55:00	30.17	H2SO4/KM 2 nO4	2	9	1	0.03315	
1202915536 MS (330229006)	26-JUL-2013 16:55:00	30.09	H2SO4/KM 2 nO4	2	9	1	0.03323	
1202915537 MSD (330229006)	26-JUL-2013 16:55:00	30.05	H2SO4/KM 2 nO4	2	9	1	0.03328	

Type	Sample Id	Description	Serial Number	Spike Amt	Units	Comments:
LCS	1202915535	PCB Laboratory Control	WE130711-04	1	mL	Final Solvent: Hexane Clean up Initials: AV Verified By: MJS Clean up SOP: GL-OA-E-037 Clean up Date: 7-26-13
MS	1202915536	PCB Laboratory Control	WE130711-04	1	mL	
MS	1202915538	PCB Laboratory Control	WE130711-04	1	mL	
MS	1202915540	PCB Laboratory Control	WE130711-04	1	mL	
MSD	1202915537	PCB Laboratory Control	WE130711-04	1	mL	
MSD	1202915539	PCB Laboratory Control	WE130711-04	1	mL	
MSD	1202915541	PCB Laboratory Control	WE130711-04	1	mL	
SURR	All	PEST LOW LEVEL SURROGATE 200 UG/L	WE130702-01	1	mL	
REGNT	All	Hexane	130710-B4	120	mL	
REGNT	All	50g KMnO4 per 1L DI H2O	1883656	5	mL	
REGNT	All	1:1 sulfuric acid	1943550	5	mL	
SOURC	All	SODIUM SULFATE	1897902	30	g	

Metals Analysis

Case Narrative

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0002**

Sample Analysis

Sample ID	Client ID
330221001	J1RVK2
330221002	J1RVK3
330221003	J1RVK4
1202915432	Method Blank (MB) ICP
1202915433	Laboratory Control Sample (LCS)
1202915439	330221001(J1RVK2L) Serial Dilution (SD)
1202915437	330221001(J1RVK2D) Sample Duplicate (DUP)
1202915438	330221001(J1RVK2S) Matrix Spike (MS)
1202920307	330221001(J1RVK2PS) Post Spike (PS)
1202915936	Method Blank (MB) CVAA
1202915937	Laboratory Control Sample (LCS)
1202915943	330221001(J1RVK2L) Serial Dilution (SD)
1202915941	330221001(J1RVK2D) Sample Duplicate (DUP)
1202915942	330221001(J1RVK2S) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Method/Analysis Information

Analytical Batch:	1317524 and 1317755
Prep Batch :	1317523 and 1317753
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 22 and GL-MA-E-010 REV# 26
Analytical Method:	SW846 3050B/6010C and SW846 7471B
Prep Method :	SW846 3050B and SW846 7471B Prep

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

System Configuration

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

Calibration Information

Instrument Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

CRDL Requirements

All CRDL standards met the advisory control limits with the exception of antimony and lead. PQL02 (analyzed at 13:43 on 08/01/13), PQL03 (analyzed at 14:20 on 08/01/13), and PQL04 (analyzed at 14:59 on 08/01/13) recovered high for antimony; however, the sample results were less than the MDL, therefore the data is reported. PQL02 (analyzed at 13:43 on 08/01/13) recovered high for lead and sample 330221001 was not less than the MDL or 2x greater than the PQL. The sample was analyzed on 3 separate passing calibrations. A bracketing PQL recovered high for lead in all 3 analyses due to possible matrix interactions. The lead results could be biased slightly high. The data is being reported.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

Continuing Calibration Blank (CCB) Requirements

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information**Method Blank (MB) Statement**

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following sample was selected as the quality control (QC) sample for this SDG: 330221001 (J1RVK2).

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes with the exception of aluminum and silicon.

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. All applicable analytes met these requirements.

Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the absence of matrix interferences.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations that are 25X the IDL/MDL for CVAA, 50X the IDL/MDL for ICP, and

100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria of less than 10% difference (%D).

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples 330221002 and 330221003 required dilutions in order to bring raw values of titanium within the linear range of the instrument, and for the analytes antimony, cobalt, lead, vanadium, and zinc that titanium interferes with, in order to ensure that the inter-element correction factors were valid on the ICP.

Preparation Information

The samples in this SDG were prepared exactly according to the cited SOP.

Miscellaneous Information

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: 1207485. A copy is included in the Miscellaneous Data section of this package.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: _____



Date: _____

08/05/13

DATA EXCEPTION REPORT			
Mo.Day Yr. 01-AUG-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1317524	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 330215(XP0001),330221(XP0002),330227(XP0003) Application Issues: Failed Recovery for MS/PS Failed RPD for DUP Other			
Specification and Requirements Exception Description:		DER Disposition:	
1. Failed Recovery for MS/PS: QC 1202915435MS,1202915438MS, 1202915441MS 2. Failed RPD for DUP: QC 1202915434DUP, 1202915440DUP 3. Low level PQL recovered high for lead:		1. The matrix spike recovery failed outside of the control limits for aluminum and silicon for 330221 and aluminum, iron, and silicon for 330215 and 330227. The post spike passed the required control limits for all analytes. This verifies the absence of a matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported. 2. The sample and sample duplicate % RPD failed outside the control limits for iron and manganese for 330227 and manganese for 330215 due to possible sample non-homogeneity. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported. 3. The samples were analyzed on 3 separate passing calibrations. A bracketing PQL recovered high for lead in all 3 analyses due to possible matrix interactions. Samples 330215001, 002, 003, 004, 005, 006 and 330221001 were not less than the MDL or 2x greater than the PQL. The lead results could be biased slightly high. The data is being reported.	

Originator's Name:

Helen Camello 01-AUG-13

Data Validator/Group Leader:

Jamie Johnson 01-AUG-13

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: XP0002 GEL Work Order: 330221 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

* Duplicate analysis not within control limits

B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).

C Target analyte was detected in the sample and the associated blank, and the sample concentration was ≤ 5 times the blank concentration.

D Results are reported from a diluted aliquot of sample.

N Spike Sample recovery is outside control limits.

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Orlette Johnson.

Reviewed by



08/05/13

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: August 5, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK2
Sample ID: 330221001
Matrix: SOIL
Collect Date: 23-JUL-13 09:45
Receive Date: 25-JUL-13
Collector: Client
Moisture: <0.1%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	3.93	3.93	11.7	ug/kg	1	NOR1	07/29/13	1646	1317755	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum	N	151000	6680	19600	ug/kg	1	HSC	07/31/13	1443	1317524	2
Arsenic	B	685	491	2950	ug/kg	1					
Barium		1870	98.2	491	ug/kg	1					
Beryllium	U	98.2	98.2	491	ug/kg	1					
Boron	U	982	982	4910	ug/kg	1					
Cadmium	U	98.2	98.2	491	ug/kg	1					
Calcium		47900	7860	24600	ug/kg	1					
Chromium	U	147	147	491	ug/kg	1					
Iron		360000	7860	24600	ug/kg	1					
Magnesium	B	24700	8350	29500	ug/kg	1					
Manganese		6450	196	982	ug/kg	1					
Molybdenum	U	196	196	982	ug/kg	1					
Nickel	U	147	147	491	ug/kg	1					
Potassium		40800	6290	24600	ug/kg	1					
Selenium	U	491	491	2950	ug/kg	1					
Silicon	N	146000	1470	9820	ug/kg	1					
Silver	U	98.2	98.2	491	ug/kg	1					
Sodium	U	6880	6880	24600	ug/kg	1					
Copper	U	295	295	982	ug/kg	1	HSC	07/31/13	1524	1317524	3
Antimony	U	324	324	982	ug/kg	1	HSC	08/01/13	1402	1317524	4
Cobalt	U	147	147	491	ug/kg	1					
Lead	BC	554	324	982	ug/kg	1					
Vanadium	B	302	98.2	491	ug/kg	1					
Zinc	C	1520	393	982	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	SW846 3050B Prep for 6010C	AXG2	07/30/13	0750	1317523
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	07/26/13	1614	1317753

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: August 5, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK2
Sample ID: 330221001

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7471B	
2	SW846 3050B/6010C	
3	SW846 3050B/6010C	
4	SW846 3050B/6010C	

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: August 5, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK3
Sample ID: 330221002
Matrix: SOIL
Collect Date: 23-JUL-13 10:15
Receive Date: 25-JUL-13
Collector: Client
Moisture: 1.55%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	4.07	4.07	12.2	ug/kg	1	NOR1	07/29/13	1653	1317755	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum	N	8520000	6910	20300	ug/kg	1	HSC	07/31/13	1510	1317524	2
Arsenic		4790	508	3050	ug/kg	1					
Barium		89100	102	508	ug/kg	1					
Beryllium	B	426	102	508	ug/kg	1					
Boron	B	1770	1020	5080	ug/kg	1					
Cadmium	B	422	102	508	ug/kg	1					
Calcium		3380000	8130	25400	ug/kg	1					
Chromium		12700	152	508	ug/kg	1					
Iron		22100000	8130	25400	ug/kg	1					
Magnesium		4680000	8630	30500	ug/kg	1					
Manganese		359000	203	1020	ug/kg	1					
Molybdenum	U	203	203	1020	ug/kg	1					
Nickel		11600	152	508	ug/kg	1					
Potassium		1970000	6500	25400	ug/kg	1					
Selenium	U	508	508	3050	ug/kg	1					
Silicon	N	339000	1520	10200	ug/kg	1					
Silver	B	308	102	508	ug/kg	1					
Sodium		134000	7110	25400	ug/kg	1					
Copper		14000	305	1020	ug/kg	1	HSC	07/31/13	1546	1317524	3
Antimony	DU	3350	3350	10200	ug/kg	10	HSC	08/01/13	1428	1317524	4
Cobalt	D	8100	1520	5080	ug/kg	10					
Lead	BD	9380	3350	10200	ug/kg	10					
Vanadium	D	53200	1020	5080	ug/kg	10					
Zinc	D	46300	4060	10200	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	SW846 3050B Prep for 6010C	AXG2	07/30/13	0750	1317523
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	07/26/13	1614	1317753

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: August 5, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK3
Sample ID: 330221002

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7471B	
2	SW846 3050B/6010C	
3	SW846 3050B/6010C	
4	SW846 3050B/6010C	

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: August 5, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK4
Sample ID: 330221003
Matrix: SOIL
Collect Date: 23-JUL-13 10:15
Receive Date: 25-JUL-13
Collector: Client
Moisture: 1.38%

Project: WCHN00213
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	3.87	3.87	11.5	ug/kg	1	NOR1	07/29/13	1655	1317755	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum	N	8660000	6840	20100	ug/kg	1	HSC	07/31/13	1513	1317524	2
Arsenic		5360	503	3020	ug/kg	1					
Barium		92800	101	503	ug/kg	1					
Beryllium	B	429	101	503	ug/kg	1					
Boron	B	1990	1010	5030	ug/kg	1					
Cadmium	B	345	101	503	ug/kg	1					
Calcium		3310000	8050	25100	ug/kg	1					
Chromium		13500	151	503	ug/kg	1					
Iron		22200000	8050	25100	ug/kg	1					
Magnesium		4700000	8550	30200	ug/kg	1					
Manganese		348000	201	1010	ug/kg	1					
Molybdenum	U	201	201	1010	ug/kg	1					
Nickel		12100	151	503	ug/kg	1					
Potassium		1970000	6440	25100	ug/kg	1					
Selenium	U	503	503	3020	ug/kg	1					
Silicon	N	340000	1510	10100	ug/kg	1					
Silver	B	292	101	503	ug/kg	1					
Sodium		127000	7040	25100	ug/kg	1					
Copper		13800	302	1010	ug/kg	1	HSC	07/31/13	1549	1317524	3
Antimony	DU	3320	3320	10100	ug/kg	10	HSC	08/01/13	1432	1317524	4
Cobalt	D	8120	1510	5030	ug/kg	10					
Lead	BD	10000	3320	10100	ug/kg	10					
Vanadium	D	53000	1010	5030	ug/kg	10					
Zinc	D	45700	4020	10100	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	SW846 3050B Prep for 6010C	AXG2	07/30/13	0750	1317523
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	07/26/13	1614	1317753

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: August 5, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0002

Client Sample ID: J1RVK4
Sample ID: 330221003

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7471B	
2	SW846 3050B/6010C	
3	SW846 3050B/6010C	
4	SW846 3050B/6010C	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: August 5, 2013

Page 1 of 7

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1317524										
QC1202915437	330221001	DUP									
Aluminum	N	151000		142000	ug/kg	6.32		(0%-20%)	HSC	07/31/13	14:48
Antimony	U	324	U	327	ug/kg	N/A	^			08/01/13	14:06
Arsenic	B	685	U	496	ug/kg	60.2	^	(+/-2980)		07/31/13	14:48
Barium		1870		1950	ug/kg	4.19	^	(+/-496)			
Beryllium	U	98.2	U	99.2	ug/kg	N/A	^				
Boron	U	982	U	992	ug/kg	N/A	^				
Cadmium	U	98.2	U	99.2	ug/kg	N/A	^				
Calcium		47900		40600	ug/kg	16.6	^	(+/-24800)			
Chromium	U	147	U	149	ug/kg	N/A	^				
Cobalt	U	147	U	149	ug/kg	N/A	^			08/01/13	14:06
Copper	U	295	U	298	ug/kg	N/A	^			07/31/13	15:27
Iron		360000		305000	ug/kg	16.6		(0%-20%)		07/31/13	14:48
Lead	BC	554	BC	753	ug/kg	30.4	^	(+/-992)		08/01/13	14:06
Magnesium	B	24700	B	21500	ug/kg	13.9	^	(+/-29800)		07/31/13	14:48
Manganese		6450		7310	ug/kg	12.6		(0%-20%)			
Molybdenum	U	196	U	198	ug/kg	N/A	^				
Nickel	U	147	B	149	ug/kg	5.76	^	(+/-496)			
Potassium		40800		43300	ug/kg	5.97	^	(+/-24800)			
Selenium	U	491	U	496	ug/kg	N/A	^				
Silicon	N	146000		162000	ug/kg	10.2		(0%-20%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 2 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1317524										
Silver		U	98.2	U	99.2	ug/kg	N/A ^		HSC	07/31/13	14:48
Sodium		U	6880	U	6950	ug/kg	N/A ^				
Vanadium		B	302	B	231	ug/kg	26.7 ^	(+/-496)		08/01/13	14:06
Zinc		C	1520	C	1490	ug/kg	2.61 ^	(+/-992)			
QC1202915433	LCS										
Aluminum	500000				465000	ug/kg		93 (80%-120%)		07/31/13	14:02
Antimony	50000				49000	ug/kg		98 (80%-120%)		08/01/13	13:18
Arsenic	50000				50400	ug/kg		101 (80%-120%)		07/31/13	14:02
Barium	50000				48300	ug/kg		96.6 (80%-120%)			
Beryllium	50000				50200	ug/kg		100 (80%-120%)			
Boron	50000				46400	ug/kg		92.7 (80%-120%)			
Cadmium	50000				50500	ug/kg		101 (80%-120%)			
Calcium	500000				489000	ug/kg		97.8 (80%-120%)			
Chromium	50000				48300	ug/kg		96.5 (80%-120%)			
Cobalt	50000				48600	ug/kg		97.1 (80%-120%)		08/01/13	13:18
Copper	50000				48200	ug/kg		96.5 (80%-120%)		07/31/13	14:46
Iron	500000				490000	ug/kg		97.9 (80%-120%)		07/31/13	14:02
Lead	50000				49300	ug/kg		98.6 (80%-120%)		08/01/13	13:18
Magnesium	500000				499000	ug/kg		99.8 (80%-120%)		07/31/13	14:02
Manganese	50000				49200	ug/kg		98.3 (80%-120%)			
Molybdenum	50000				48000	ug/kg		96.1 (80%-120%)			
Nickel	50000				49400	ug/kg		98.7 (80%-120%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 3 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1317524										
Potassium	500000			492000	ug/kg		98.4	(80%-120%)	HSC	07/31/13	14:02
Selenium	50000			53500	ug/kg		107	(80%-120%)			
Silicon	500000			438000	ug/kg		87.6	(80%-120%)			
Silver	50000			48300	ug/kg		96.6	(80%-120%)			
Sodium	500000			466000	ug/kg		93.2	(80%-120%)			
Vanadium	50000			50100	ug/kg		100	(80%-120%)		08/01/13	13:18
Zinc	50000			51300	ug/kg		103	(80%-120%)			
QC1202915432	MB										
Aluminum			U	6720	ug/kg					07/31/13	13:58
Antimony			U	326	ug/kg					08/01/13	13:14
Arsenic			U	494	ug/kg					07/31/13	13:58
Barium			U	98.8	ug/kg						
Beryllium			U	98.8	ug/kg						
Boron			U	988	ug/kg						
Cadmium			U	98.8	ug/kg						
Calcium			U	7910	ug/kg						
Chromium			U	148	ug/kg						
Cobalt			U	148	ug/kg					08/01/13	13:14
Copper			U	296	ug/kg					07/31/13	14:43
Iron			U	7910	ug/kg					07/31/13	13:58
Lead			B	456	ug/kg					08/01/13	13:14
Magnesium			U	8400	ug/kg					07/31/13	13:58

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 4 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1317524										
Manganese			U	198	ug/kg				HSC	07/31/13	13:58
Molybdenum			U	198	ug/kg						
Nickel			U	148	ug/kg						
Potassium			U	6320	ug/kg						
Selenium			U	494	ug/kg						
Silicon			U	1480	ug/kg						
Silver			U	98.8	ug/kg						
Sodium			U	6920	ug/kg						
Vanadium			U	98.8	ug/kg					08/01/13	13:14
Zinc			B	472	ug/kg						
QC1202915438 330221001 MS											
Aluminum	490000	N	151000	N	912000	ug/kg	155 *	(75%-125%)		07/31/13	14:52
Antimony	49000	U	324		49900	ug/kg	102	(75%-125%)		08/01/13	14:10
Arsenic	49000	B	685		51000	ug/kg	103	(75%-125%)		07/31/13	14:52
Barium	49000		1870		51300	ug/kg	101	(75%-125%)			
Beryllium	49000	U	98.2		51200	ug/kg	104	(75%-125%)			
Boron	49000	U	982		47300	ug/kg	96.3	(75%-125%)			
Cadmium	49000	U	98.2		50900	ug/kg	104	(75%-125%)			
Calcium	490000		47900		530000	ug/kg	98.4	(75%-125%)			
Chromium	49000	U	147		49600	ug/kg	101	(75%-125%)			
Cobalt	49000	U	147		49900	ug/kg	102	(75%-125%)		08/01/13	14:10
Copper	49000	U	295		49300	ug/kg	101	(75%-125%)		07/31/13	15:30

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 5 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1317524										
Iron	490000	360000		821000	ug/kg		94	(75%-125%)	HSC	07/31/13	14:52
Lead	49000	BC	554	50300	ug/kg		101	(75%-125%)		08/01/13	14:10
Magnesium	490000	B	24700	539000	ug/kg		105	(75%-125%)		07/31/13	14:52
Manganese	49000		6450	57100	ug/kg		103	(75%-125%)			
Molybdenum	49000	U	196	48600	ug/kg		99.1	(75%-125%)			
Nickel	49000	U	147	50400	ug/kg		103	(75%-125%)			
Potassium	490000		40800	552000	ug/kg		104	(75%-125%)			
Selenium	49000	U	491	54100	ug/kg		110	(75%-125%)			
Silicon	490000	N	146000	N	789000	ug/kg	131 *	(75%-125%)			
Silver	49000	U	98.2	49400	ug/kg		101	(75%-125%)			
Sodium	490000	U	6880	499000	ug/kg		101	(75%-125%)			
Vanadium	49000	B	302	51300	ug/kg		104	(75%-125%)		08/01/13	14:10
Zinc	49000	C	1520	52900	ug/kg		105	(75%-125%)			
QC1202920307 330221001 PS											
Aluminum	5000	N	1540	6500	ug/L		99.2	(80%-120%)		08/01/13	16:54
Silicon	5000	N	1490	7030	ug/L		111	(80%-120%)			
QC1202915439 330221001 SDILT											
Aluminum		N	1540	D	315	ug/L	2.25	(0%-10%)		07/31/13	14:55
Antimony		U	1.31	DU	1620	ug/L	N/A	(0%-10%)		08/01/13	14:13
Arsenic		B	6.97	DU	2460	ug/L	N/A	(0%-10%)		07/31/13	14:55
Barium			19.0	D	4.03	ug/L	5.82	(0%-10%)			
Beryllium		U	0.171	DU	491	ug/L	N/A	(0%-10%)			
Boron		U	1.15	DU	4910	ug/L	N/A	(0%-10%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 6 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1317524										
Cadmium	U	-0.217	DU	491	ug/L	N/A		(0%-10%)	HSC	07/31/13	14:55
Calcium		488	D	99.4	ug/L	1.91		(0%-10%)			
Chromium	U	0.785	DU	737	ug/L	N/A		(0%-10%)			
Cobalt	U	1.11	DU	737	ug/L	N/A		(0%-10%)		08/01/13	14:13
Copper	U	-1.86	DU	1470	ug/L	N/A		(0%-10%)		07/31/13	15:33
Iron		3670	D	733	ug/L	.00273		(0%-10%)		07/31/13	14:55
Lead	BC	5.64	DU	1620	ug/L	N/A		(0%-10%)		08/01/13	14:13
Magnesium	B	252	DU	41800	ug/L	N/A		(0%-10%)		07/31/13	14:55
Manganese		65.6	D	12.9	ug/L	1.95		(0%-10%)			
Molybdenum	U	0.662	DU	982	ug/L	N/A		(0%-10%)			
Nickel	U	1.43	DU	737	ug/L	N/A		(0%-10%)			
Potassium		416	D	83.7	ug/L	.745		(0%-10%)			
Selenium	U	4.23	DU	2460	ug/L	N/A		(0%-10%)			
Silicon	N	1490	D	305	ug/L	2.26		(0%-10%)			
Silver	U	-0.0859	DU	491	ug/L	N/A		(0%-10%)			
Sodium	U	51.8	DU	34400	ug/L	N/A		(0%-10%)			
Vanadium	B	3.07	DU	491	ug/L	N/A		(0%-10%)		08/01/13	14:13
Zinc	C	15.5	DU	1960	ug/L	N/A		(0%-10%)			
Metals Analysis-Mercury											
Batch	1317755										
QC1202915941	330221001	DUP									
Mercury	U	3.93	U	3.96	ug/kg	N/A	^		NOR1	07/29/13	16:48
QC1202915937	LCS										

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 330221

Client SDG: XP0002

Project Description: RC-232 Soil

Page 7 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch	1317755										
Mercury	117			120	ug/kg		103	(80%-120%)		07/29/13	16:26
QC1202915936	MB										
Mercury			U	3.96	ug/kg				NOR1	07/29/13	16:25
QC1202915942	330221001	MS									
Mercury	115	U	3.93	116	ug/kg		101	(80%-120%)		07/29/13	16:50
QC1202915943	330221001	SDILT									
Mercury		U	-0.031	DU	19.7	ug/L	N/A	(0%-10%)		07/29/13	16:51

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.